

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of:

| | | |
|---|---|---------------------|
| Revision of Part 15 of the Commission's Rules |) | |
| to Permit Unlicensed National Information |) | |
| Infrastructure (U-NII) Devices in the 5 GHz |) | ET Docket No. 13-49 |
| Band |) | |

To: The Commission

REPLY COMMENTS OF SHARED SPECTRUM COMPANY

Shared Spectrum Company ("SSC") hereby submits its reply comments in the above captioned proceeding.

I. *ADOPTION OF SENSING-BASED SOLUTIONS*
WILL ENABLE MORE SHARING OF THE 5 GHZ BAND.

The NPRM¹ proposes to allocate 195 MHz in the 5 GHz band for unlicensed services, including Wi-Fi. Subsequent to the issuance of the NPRM, the White House released a "Memorandum for the Heads of Executive Departments and Agencies," in which President Obama stated that:

¹ In the Matter of Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, ET Docket No. 13-49, *Notice of Proposed Rule Making*, 28 FCC Red 1769 (2013).

[W]e must make available even more spectrum and create new avenues for wireless innovation. One means of doing so is by allowing and encouraging shared access to spectrum that is currently allocated exclusively for Federal use. Where technically and economically feasible, sharing can and should be used to enhance efficiency among all users and expedite commercial access to additional spectrum bands, subject to adequate interference protection for Federal users, especially users with national security, law enforcement, and safety-of-life responsibilities.²

SSC agrees that every effort should be made to facilitate sharing wherever technically and economically feasible, while balancing public safety and national security concerns. In particular, SSC notes that sensing-based technologies, alone or in concert with geo-location databases, can facilitate enhanced spectrum sharing among diverse groups of users.³ Indeed, in most applications, a sensing-based regime expands the opportunities for sharing among various services well beyond that afforded by other alternative technical solutions.

For example, as stated by Spectrum Bridge, the first TV White Spaces administrator, “sensing technology is a critical and complimentary component of successful spectrum sharing, particularly when integrated with a policy manager/geo-location database.”⁴ The need to expedite and maximize shared access to the 5 GHz band was emphasized by the National Cable and Telecommunications Association (“NCTA”), which highlighted the critical nature of cable Wi-Fi to our national economy, and

² Memorandum on Expanding America's Leadership in Wireless Innovation, 78 Fed. Reg. 37431 (June 14, 2013).

³ Comments of Shared Spectrum Company at 6-7 (“SSC Comments”).

⁴ Comments of Spectrum Bridge at 6.

cautioned that further delays in gaining access to additional 5 GHz spectrum could have a significant adverse effect on the development of the new Wi-Fi technology known as 802.11ac.⁵ Similarly, the Information Technology and Industry Council reinforced the need to expand unlicensed access to the 5 GHz band, pointing out that both Dedicated Short Range Communications ("DSRC") and Wi-Fi are based on the 802.11 standard.⁶

However, not every manufacturer appears to support the use of advanced techniques for sharing spectrum. Oddly enough, one such naysayer is Motorola Solutions, which speculates that enhanced spectrum-sensing technologies would add cost and complexity to unlicensed devices.⁷ This unsupported assertion must be juxtaposed with the fact that Motorola Solutions today produces some of the more popular Wi-Fi hotspot solutions, which already rely upon similar types of sensing capabilities, and for which demand is growing, according to Motorola Solutions' own comments.⁸

In fact, enhanced sensing techniques are available today, need not be complex, and are readily affordable. SSC's Spectrum Sensing Toolbox ("SST"), for example, is a software package that enables highly reliable radio frequency sensing by wireless devices operating in the TV White Spaces and other spectrum bands, such as the 5 GHz band at

⁵ Comments of NCTA at 25 ("NCTA Comments").

⁶ Comments of the Information Technology and Industry Council at 8.

⁷ Comments of Motorola Solutions at 10-11 ("Motorola Comments").

⁸ Motorola Comments at 11. In comments that seem to mirror Motorola Solutions' internally contradictory stance, the Wi-Fi Alliance appears to oppose the mandatory use of either sensing, a geo-location database, or any other similar technologies designed to protect incumbents. *See* Comments of the Wi-Fi Alliance at 28. It is unclear how the Commission can expand access to the 5 GHz band without ensuring adequate protection for incumbent users.

issue in this proceeding. The SST represents over a decade of engineering and field testing work for military and commercial users. This enhanced sensing technology selects the best frequency based on a mix of local sensing, database assignments, and policy preferences. It can be embedded into a variety of devices, including base stations and handsets, or it can be deployed as a stand-alone device. Since it is software based, no modification to existing hardware is required.⁹

After years of *de facto* use in Wi-Fi technology, the feasibility of spectrum sensing, both from an economic as well as a technical standpoint, is well established. The continual growth in demand for Wi-Fi devices means that any additional incremental costs of adding enhanced sensing capabilities to those devices will be more than offset by the burgeoning demand for such services. SSC believes that a balance must be struck between sharing spectrum with unlicensed Wi-Fi users and protecting important incumbent systems. Enhanced sensing-based technologies represent the most efficacious solution to these dual, competing interests.

II. *SENSING IN THE DSRC ENVIRONMENT.*

The auto industry is understandably concerned that unlicensed systems may not "look" for lower powered DSRC devices that operate in a car-to-car or car-to-roadside mode. The Alliance of Automobile Manufacturers seems to believe that effective sensing

⁹ See, e.g., <http://www.sharespectrum.com/wp-content/uploads/Spectrum-Sensing-Toolbox-a-data-sheet-050212.pdf>, for detailed discussion of SST's capabilities and functionality.

technology must be specially developed to ensure effective DSRC-unlicensed device cohabitation.¹⁰ Savari Networks raised similar concerns, that unlicensed devices may not be able to sense and avoid DSRC signals.¹¹ Likewise, The American Association of State Highway and Transportation Officials ("AASHTO") called for further study of sharing between DSRC and unlicensed devices before any final rules are developed.¹² The Utah Department of Transportation points out that the NTIA is still studying the potential for sharing the 5.9 GHz DSRC band, and that, therefore, any near-term action in the instant proceeding would be premature.¹³

SSC agrees with these commenters to the extent that further sharing studies regarding the 5.9 GHz band may prove useful. SSC urges those who wish to gain access to that band -- such as the NCTA, the Wi-Fi Alliance, and/or individual manufacturers -- to fund an independent study of the potential utility of sensing-based technologies and how they might be implemented in the 5.9 GHz band. Such an independent study could accelerate the process already underway at the NTIA.

It must be noted, however, that SSC's existing technology already detects and classifies, e.g., man-made noise, so there is no reason to believe that SSC's sensing solutions could not similarly detect low level DSRC communications. SSC believes that sensing technologies provide the best solution for sharing among unlicensed users

¹⁰ Comments of the Alliance of Automobile Manufacturers at 29.

¹¹ Comments of Savari Networks at 35.

¹² Comments of AASHTO at 11-12.

¹³ Comments of the Utah Department of Transportation at 2.

and vehicle-based DSRC systems. Manufacturers could easily build specific sensing capabilities into, e.g., their Wi-Fi gear for use in the upper portion of the band that is to be shared with DSRC; that gear would "look" for DSRC systems and avoid interfering with them, just as SSC-based systems do today in other bands.

There do not appear to be any significant technical or economic obstacles to the successful use of this technology in the DSRC context. This technology can be integrated into Vehicle-to-Infrastructure or Vehicle-to-Vehicle systems in a cost effective manner, which would provide a solid technical solution for vehicle-based systems, and a boon to the Intelligent Transportation Industry overall.

III. *ANTI-TAMPERING PROPOSALS MAY BE UNWORKABLE AND TOO COSTLY.*

SSC shares the view expressed by Ericsson that the Commission's proposed anti-tampering proposal is unworkable.¹⁴ The NPRM proposes adoption of a technical solution whereby tampering with a device automatically renders it inoperable. Like NCTA,¹⁵ SSC believes the FCC should define device capabilities, not specific technical requirements, in order to keep manufacturing costs low and add security features when possible.

¹⁴ Comments of Ericsson at 7.

¹⁵ NCTA Comments at 23.

As SSC noted in its initial comments, adding requirements such as a tamper-proof “kill switch” may actually impede further deployment of Wi-Fi and other unlicensed services.¹⁶ In particular, the significant additional cost and complexity of tamper-proof solutions could limit the availability of future devices for consumers, and have the exact opposite effect the Commission seeks by limiting, rather than expanding, Wi-Fi use in this band.

Instead, the Commission should promote the increased reliance upon sensing-based devices, both in concert with a geo-location database and as a stand-alone option. In this way, regardless of the band, the unlicensed device will automatically look to avoid interference with those already present and operating. This seamless, transparent function provides the best disincentive to tampering, as there is no appreciable advantage to be gained through tampering.

¹⁶ SSC Comments at 6.

CONCLUSION

SSC supports the Commission's overall effort to open more of the 5 GHz band to sharing among users, including Wi-Fi and federal operators. As the leader in sensing-based technologies for radios, sensors and software applications, SSC strongly believes that sensing alone can play a significant role in permitting vast swaths of federal spectrum to be opened to sharing with other users, both commercial and unlicensed.

In particular bands, where concerns regarding potential interference to incumbents may be particularly acute, SSC urges the Commission to adopt, as a first step, geo-location database requirements that include sensing as part of that spectrum-sharing system. In all other bands, SSC believes sensing alone can and should predominate.

Of particular concern to SSC is the perceived need, suggested by some commenters, to further study the DSRC portion of the band in order to facilitate sharing and minimize disruption to Intelligent Transportation initiatives. Private industry can move this matter forward by funding a study to examine the utility of using enhanced sensing technologies, such as SSC's SST software, to ensure against interference among all manner of higher-powered unlicensed devices and lower-powered DSRC devices.

Finally, imposing a tamper-proof requirement may prove as unworkable as the proverbial attempt to put the genie back in the bottle. Once technology is released to the marketplace, the ingenuity of users to alter that technology is seemingly boundless. A

better approach, SSC believes, is to have all unlicensed technology sense potential interference scenarios and seamlessly avoid them before transmitting, thereby eliminating the incentive to tamper with the device.

Respectfully submitted,

SHARED SPECTRUM COMPANY

By: /s/ Thomas A. Stroup
Thomas A. Stroup
Chief Executive Officer

1593 Spring Hill Road
Suite 700
Vienna, Virginia 22182
(703) 761-2818
tstroup@sharedspectrum.com

Of Counsel
Jeffrey H. Olson
William J. Lewis
St. Ledger-Roty Neuman & Olson LLP
1250 Connecticut Avenue, N.W.
Suite 200
Washington, DC 20036
(202) 454-79401
jolson@slrno.com

July 24, 2013

Certificate of Service

I, William Lewis, counsel for Shared Spectrum Company, hereby certify that on July 24, 2013, I caused copies of the foregoing Reply Comment of Shared Spectrum Company to be delivered to the following parties via electronic mail.

/s/ William J. Lewis
William J. Lewis

Peter Stanforth
CTO, Spectrum Bridge
peter@spectrumbridge.com

Rick Chessen
Senior Vice President, Law & Regulatory Policy, National Cable & Telecommunications Association
rchessen@ncta.com

Jennifer K. McKee
Vice President & Associate General Counsel, National Cable & Telecommunications Association
jmckee@ncta.com

Vince Jesaitis
Director, Government Relations, Information Technology Industry Council
vjesaitis@itc.org

Chuck Powers
Director, Engineering and Tech Policy, Motorola Solutions, Inc.
chuck.powers@motorola.com

Edgar Figueroa
Chief Executive Officer, Wi-Fi Alliance
efigueroa@wi-fi.org

Katie Peters
Senior Director, Government Relations, Motorola Mobility
kpeters@motorola.com

Aparna Sridhar
Telecom Policy Counsel, Public Policy Department, Google, Inc.

aparnasridhar@google.com

Robert Strassburger
Vice President, Safety & Harmonization, Alliance of Automobile Manufacturers
rstrassburger@autoalliance.org

Michael Cammisa
Director, Safety, Association of Global Automakers, Inc.
mcammisa@globalautomakers.org

Ari Fitzgerald
Counsel for The Alliance of Automobile Manufacturers and the Association of Global Automakers, Inc.
ari.fitzgerald@hoganlovells.com

Frederick Joyce
Counsel for Savari Networks
rjoyce@Venable.com

Tiffany Nichols
Counsel for Savari Networks
tmnichols@Venable.com

Frederick Wright
Executive Director, The American Association of State Highway and Transportation Officials
bwright@aaashto.org

Alan Tilles
Counsel for The American Association of State Highway and Transportation Officials
atilles@shulmanrogers.com

John Njord,
Executive Director Transportation, Utah Department of Transportation
jnjord@utah.gov

Mark Racek
Director, Spectrum Policy, Ericsson
mark.racek@ericsson.com

Jared M. Carlson
Director, Government and Industry Relations, Ericsson
jared.carlson@ericsson.com